

The second observation is related to the condition of the colloidal silica after the treatment. It becomes a gel in the bluish zone. This coagulation occurs due to the adsorption of the cupric ions and resultant decrease in surface charge. In order to prevent such silica coagulation, the silica must be pumped through the membrane during the process. Continuous monitoring of the zeta potential of the silica stream would allow the adsorbent to be refreshed before it starts to coagulate.

### CLAIM

We claim:

1. A process for the selective dialysis of the waste water containing heavy metals comprising the flowing steps of:

providing a porous membrane, said membrane having pores of sufficient dimension to allow passage of the heavy metals ions through,

circulating a concentrated dispersion of silica miscible with said waste water against a first side of said membrane, said silica particles having dimension large than that of said pores;

passing said waste water containing said heavy metals ions against a second side said membrane whereby certain of said materials becomes bound to said silica particles upon passing through said membrane to said first side in a concentration greater than their concentration in said liquid stream and thereby become separated from the said liquid stream;

2. A process as set forth in claim 1, wherein said waste water flow the opposite direction to the said silica dispersion, the counter-flow mode;

3. A process as set forth in claims 1 and 2, wherein said membrane is organized as membrane device comprises a lumen of a bundle of hollow fibers with silica dispersion flowing either inside or outside of the fibers and wastewater flowing on the opposite side of the fiber membrane;

4. A process as set forth in claims 1, 2, and 3, wherein said concentrated silica dispersion is colloidal silica;

5. A process as set forth in claims 1, 2 and 3, wherein said concentrated silica dispersion is fumed silica; .

6. A process as set forth in claim 1 and 3, wherein said colloidal silica saturated with adsorbed ions is pumped out and allowed to solidify.

7. A process as set forth in claim 6, wherein said colloidal silica saturated with adsorbed ions is pumped out and heat treated for solidification.

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